AN INVESTIGATION ON THE IMPACT OF PRIVATIZING THE SOLID WASTE COLLECTION IN KWADUKUZA MUNICIPALITY, KWAZULU-NATAL PROVINCE

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ABSTRACT

According to Schedule 5b, of the Constitution of the Republic of South Africa 1996, waste management is an essential service to be provided by local government. Failure to deliver proper services could lead to an unhealthy and polluted environment. The municipal waste departments experience inadequate operational budgets, increases in operating costs, the rising cost of replacement capital expenses, and skyrocketing exposure to environmental liability. These challenges make privatization appear attractive. The privatization of solid waste collection has been used as an intervention for the challenges faced by local governments. This study examines the effects of privatizing solid waste collection in local government, focusing on the KwaDukuza municipality located in South Africa in KwaZulu-Natal province. This study employed a quantitative approach. The primary data was obtained from ward committee members and waste company employees through questionnaires. Primary data were collected from 80 participants 70 ward committee members and ten from waste collection company employees). Probability random sampling was used in this study. The results of the study indicated that households want waste collection services to be performed by the government. This may be attributed to the wards' view that privatization of waste collection does not necessarily translate into improved efficiency, but neither do essential services become affordable. Furthermore, the results showed that inadequate road networks deprive fair waste collection in poor communities, and there are many free riders in the waste collection system. Although it was found that the collection of waste was sustainable, this study recommends that the municipalities that privatize waste collection services should act as the watchdog and protect the disadvantaged group from being exploited by private waste collectors.

Keywords: Privatization, Waste Collection, Municipality, Service Delivery.

INTRODUCTION

Sections 24 (a) and (b) of the Republic of South African Constitution stipulates the importance of everyone having the right to an environment that is harmless to health and well-being. The National Environment Management Act 59 of 2008 also highlight the importance of protecting the health and the environment by providing reasonable steps for the prevention of pollution and ecological degradation, by providing institutional arrangements and planning

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matters, and delivering the national norms and standards for regulating the management of waste by all government spheres and sectors.

Solid waste management is predominantly a local government function. Section 156(1)(a) of the Constitution allocates solid waste management such as waste removal, dumps sites for waste, solid waste disposal, and cleaning as a responsibility of the local government (Polasi et al., 2020). These authors further indicated that the metropolitan municipalities deliver a complete service, including "*waste collection and appropriate disposal while rural-based local municipalities lack the capacity for any form of waste service delivery*" (Polasi et al., 2020). In South Africa, more than 80% of the general waste produced in the country ends up in landfills, while 10% is recycled (Statistics South Africa, 2016).

Challenges faced by local municipalities in South Africa cause huge variations in waste management between rural and urban areas (Viljoen et al., 2021). For example, on the one hand, municipalities operating in the rural areas lack the sites/place to dump waste, and communities largely utilize unregulated communal waste fills. On the other hand, municipalities operating in the urban areas almost exclusively depend on landfills for waste disposal (Statistics South Africa, 2016). According to Statistics South Africa (2016), *"87,8% of households in urban areas had access to weekly waste removal, while 78,9% of rural households still depended on household refuse dumps".* According to van Niekerk and Weghmann (Niekerk & Weghmann, 2018), in remote "*poor areas, the problem is particularly acute, with limited or non-existent waste collection services".* The inability of the municipality to collect, store, and dispose of waste can lead to public health problems and mainly affect underprivileged households (Simatele et al., 2017; Statistics South Africa, 2016; Han et al., 2018; Dlamini et al., 2019; Banerjee & Sarkhel, 2019; Rasmeni & Madyira, 2019; Kubanza & Simatele, 2020; Viljoen et al., 2021). Therefore, the lack of waste management in remote areas poses major challenges for communities and governments of developing countries (Han et al., 2018; Viljoen et al., 2021).

The majority of rural-based local municipalities do not have enough budgets for waste management. They lack infrastructure, proper equipment, treatment centers, and the inability to generate revenue. Such factors affect the ability of rural-based municipalities to collect and dispose of waste properly (Hidalgo et al., 2017; Mihai & Taherzadeh, 2017; Viljoen et al., 2021). According to Viljoen et al. (2021), "*most previous research in South Africa on household waste management focused on urban areas,"* with the lack of studies about waste management in the rural areas (Han et al. 2018; Viljoen et al., 2021). Hence, this study examined the performance of private solid waste collection in the rural areas of KwaDukuza. The objectives of the study were to: (i) determine citizens' willingness to pay for the collection of solid waste, (ii) determine the effect of privatization of solid waste collection on poor households, (iii) assess the strategies in place for better management and collection of solid waste in the KwaDukuza municipality, and (iv) determine the level of household's satisfaction with the privatized service of waste collection.

The solid waste sector in KwaDukuza has not provided an adequate and sustainable solid waste service to the community. The main problem in this municipality is the inadequacy and unsustainability of access to solid waste services for the community. This poor state of solid waste management is characterized by inadequate coverage, irregular waste collection, indiscriminate dumping, waste spillover from bins and storage containers, and waste littering this leaves much to be desired. The privatization of solid waste collection has led to an unaffordable

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price for this service. The number of illegal dumping areas has increased because of people not paying for the service. The following section provides literature on solid waste management in global, sub-Saharan African countries, and South African contexts. The conceptual framework underpinning this article is explained to assist with the understanding of refuse waste management in rural areas. Furthermore, the research methodology utilized in the study, the presentation and discussion of the data and recommendations will be explained.

LITERATURE ANALYSIS

Solid Waste Management in a Global Context

The Materials and Methods should be described with sufficient details to allow others to replicate and build on the published results. The world is faced with the issue of municipal solid waste management, and it is a significant problem in terms of the volumes of waste generated by human lifestyles. To date, population growth, higher economic development, and improving human lifestyles contribute to the rising volume of waste every day (Gardner, 2013). Every year approximately 1.3 billion tons of municipal solid waste are being generated (Gardner, 2013). As such, a large amount of waste generated is becoming a growing concern due to the ecological impact of improper waste management, resulting in waste degradation and the release of toxic emissions (Karak et al., 2012).

Despite the municipal solid waste management challenges experienced by the developed and the developing world, first-world countries are leading in managing municipal waste. They have made municipal solid waste management a priority; by developing regulations and sustainable measures concerning solid waste use. First-world countries have put in place monitoring mechanisms that seek to promote and support municipal solid waste in the developing agendas of cities (Karak et al., 2012). Therefore, tremendous amounts of waste are handled in different ways in accordance with the physical characteristics of the waste generated. The main reason for this is the variation in the physical characteristics of the waste generated. In developed countries, for example, waste composition tends to be more recyclable materials (Chandrappa & Das, 2012). Developing countries tend to buy more raw materials, depending on imported new and used goods, increasing the percentage of organic waste (Chandrappa & Das, 2012; Guerrero, 2013). In various countries of the world, therefore, different waste management practices exist. Among the best practices include proper composting, recycling, waste-to-energy technologies, and sanitary landfilling for the ultimate disposal of waste (Guerrero, 2013). Cities without adequate waste management practices continuously suffer from the indiscriminate dumping of waste, which is worsened by negative attitudes about safe and secure disposal (Johari, 2012). Countries with improved waste management practices and infrastructure still face challenges, including the recycling of products, not recyclables, and insufficient waste sorting and recycling facilities (Singh et al., 2014).

The amount of waste generated in developed countries is much more significant than in developing countries. United Nations Development Programme confirmed this observation in 2011, which states the average municipal solid waste generation rate for developing countries is 0,79kg/capita/day, compared to 1,55kg/capita/day for developed countries. These differences are because individuals in developed countries tend to have a higher income, a higher standard of living, and GDP per capita (Simelane & Mohee, 2015; Mohee & Mudhoo, 2015). However,

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Hoornweg & Bhada-Tata, (2012) revealed that municipal solid waste has a much bigger proportion of organic waste in developing countries than in developed countries, and open dumpsites are mainly utilized methods of disposing of waste.

Contextualizing Solid Waste Management in Sub-Saharan African Cities

Many cities in sub-Saharan African countries experience high population growth rates due to increased migration, urbanization, industrialization, and modernization (Simelane & Mohee, 2015). These processes have resulted in increased numbers of urban residents and increased generation of solid waste. Unfortunately, these changes have taken place in a context of rapid economic stagnation and deterioration, coupled with weak institutional and policy frameworks. The lack of financial resources, as observed by Simatele and Etambakonga (2015), has not only made it difficult for local authorities to manage solid waste effectively but has prevented people from solving urban-based problems and challenges.

Kubanza and Simatele (2016) found that the available local authority resources have not provided services to the growing urban population such as maintenance of roads, sewerage and water systems, infrastructure for waste management, and running supplying socio-economic amenities. Gumbo and Simelane (2015) observed that the regular collection and disposal of household refuse in most African cities is highly inadequate, especially in poor neighborhoods. The waste generated is hardly collected and is dumped in any available space in the town (Simatele & Simatele, 2015).

Weak institutional frameworks, scarce skilled labor, economic deteriorations have all resulted in poor waste removal (Kubanza & Simatele, 2016; Simatele & Etambakonga, 2015). These factors have made municipal waste management an environmental challenge in many African countries (Simatele & Etambakonga, 2015). As a result, waste collection is still overlooked in sub-Saharan African cities, with municipal solid waste collection rates ranging from 20% to 80% [22, 28]. Kubanza & Simatele (2016) and Simatele & Etambakonga (2015) observed that only 15 % of solid waste was collected in Lusaka, 17 % in Dar es Salaam and 13 % in Kinshasa due to poor infrastructure and a lack of refuse trucks. Low-income areas in sub-Saharan African cities not serviced by accessible roads have tended to sink in sewage and piles of stinking waste since these areas cannot have access to trucks (Cheru, 2012; El-Khattam et al., 2012).

Most cities in sub-Saharan African countries lack appropriate policies and legislation that would support investment in waste recycling. In instances where these policies and legislative instruments exist, their application has proven inconsistent (Sentime, 2014). The lack of comprehensive policies and technical ‘know-how’ has contributed to the failure in devising the appropriate strategies, approaches, and technologies that would have resulted in effective waste management practices and contributed to sustainable municipal waste management development in sub-Saharan Africa (Simelane & Mohee, 2015). Sentime (2014) and Simelane & Mohee (2015) argued that the development of effective municipal waste systems in the sub-Saharan African cities would depend on looking for African urban/rural management strategies and sharpen the theoretical and practical abilities of the state to adapt formal institutions to new and changing realities.

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Solid Waste Management and Privatization in South Africa

Solid waste management is predominantly a local government function. Solid waste management service is crucial, and it should be provided to every household as it is strongly related to the question of public health and environmental protection (Kubanza & Simatele, 2016). The majority of rural-based local municipalities do not have enough budgets for waste management. They lack infrastructure, proper equipment, treatment centers, and the inability to generate revenue. Such factors affect rural-based municipalities' ability to collect and dispose of waste properly (Hidalgo et al., 2017; Mihai & Taherzadeh, 2017), and they cause considerable variations in waste management between rural and urban areas (Viljoen et al., 2021).

There are large discrepancies between waste services provided to households in rural and urban areas and, to a lesser extent, between urban and metropolitan areas. In the year 2018, Statistics South Africa found that *"87,8% of households in urban areas had access to weekly waste removal, while 78,9% of rural households still depended on household refuse dumps"* (Statistics South Africa, 2016). A study by Rodseth et al., (2020) on waste management found that *"94.5% and 87% of households in metropolitan and urban areas, respectively, receive some form of waste management service, while in rural areas this decreases to just 13%".* The statistics above show that the majority of the rural households (87%) are not benefiting from the waste management service, which the local municipalities must provide. Factors such as weak institutional & policy framework and inadequate infrastructure and financial resources have put local municipalities under pressure and made it challenging to manage municipal waste management services effectively (Mutanga et al., 2013; Simatele & Etambakonga, 2015; Simatele et al., 2017; Dlamini et al., 2019). Although the households in the urban and metro areas are being serviced, the illegal dumping of waste still occurs. Table 1 below shows which households largely benefit from the waste management service in South Africa.

Table 1
HOUSEHOLD WASTE COLLECTION IN SOUTH AFRICA

	Total	Rural	Urban	Metro
Refuse removed at least once a week	63.50%	9.60%	8.10%	88%
Refuse removed less than once a week	2.40%	1.00%	3.40%	2.70%
Communal refuse dumb	2.90%	2.20%	2.00%	3.90%
Own refuse dumb	28%	82%	10%	3.90%
Dumb rubbish anywhere	2.80%	4.40%	3.10%	1.50%
Other	0.40%	1.10%	0.40%	0.10%
Percentage of serviced households	69%	13%	87%	94.50%
Percentage of un-serviced households	31%	87%	13%	5.50%

Source: Rodseth, Notten et al., 2020

In addition to the above challenges, certain municipalities are unable to deal with the waste problem due to the lack of qualified and experienced staff, rising operating costs, and lack of municipal commitment towards waste collection. Thus, municipalities that are experiencing such challenges have been contracting out the waste management services to be delivered by private companies. Due to these challenges, municipalities believe that the solution may lie in

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privatizing the waste management service (Niekerk &Weghmann, 2018). The partnership between private and public institutions serves as an alternative governance and management tool in the waste management sector (Zafra et al., 2013; Zhu et al., 2016). However, Zafra et al. (2013) noted that there are no systemic cost savings in contracting out the delivery of waste management services, and privatization of waste management services can increase operational costs compared to public management.

The extension of the market mechanisms of the New Public Management (NPM) to private sector involvement in solid waste collection services is still an emerging issue, especially in developing countries. By contracting out solid waste services to the private sector and charging for services rendered by the private sector, the municipalities face difficulties. Public service delivery, such as water supply, sanitation, and solid waste services, has been failing for a long time, despite the NPM and decentralization of local service delivery to the local government. The expected improvements in service delivery have often not been achieved (Dijk & Blokland, 2016). Decentralization alone was not enough to improve service delivery; therefore, private sector involvement in public service delivery was introduced. Governments vigorously began to promote the private sector as providers of certain services to improve service efficiency and effectiveness (Batley & Larbi, 2014; Roth, 1987), but private finance and expertise to improve are still issues.

Theoretical Framework

This study focused on a New Public Management approach. The idea with the privatization of solid waste is to cut costs and ensures efficiency. The New Public Management focuses on the decentralization of service delivery to local governments. Public services delivery, such as water supply, sanitation, and solid waste services, have been encouraged to be privatized. The whole idea with New Public Management promoting the privatization of services is to improve service delivery. According to Anestina et al. (2014), the strategy of *"delivering modern, high-quality public services and promoting competition in the waste management sector leads to the formation of private sector participation to handle waste management".* Oduro-Kwarteng (2011) stipulated that the key elements of New Public Management theory may be categorized into two main strands: on the one hand, are *"ideas that emphasize managerial improvement"*, and on the other hand are *"techniques and practices that emphasize markets and competition"*. It is assumed that the financial burden on the state will be reduced through the application of NPM on government processes (Oduro-Kwarteng, 2011; Anestina et al., 2014). It is also argued that reforming service provision along market mechanism lines will improve service quality (Oduro-Kwarteng, 2011). This study utilised the second strand in explaining the involvement and regulation of the private sector. The theoretical case is that the participation of the private sector in service provision will lead to improved pricing and user charging, better service quality, improved productivity, and responsiveness to users.

MATERIALS AND METHODS

The study site for this research was KwaDukuza, which is located in KwaZulu-Natal, South Africa. This was previously known as the Dolphin Coast Municipality. The KwaDukuza Municipality (KZN292) is situated in the north coastal region of KwaZulu-Natal, about 50km

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north of Durban. It has a population of approximately 276,716 inhabitants, according to Statistics South Africa (Census) 2016. The site consists of eight (8) out of 29 wards of the KwaDukuza Municipality. The criterion for the selection was based on these eight wards being the only area of the municipality where the service is privatized. The study was not carried out in the remaining other wards since the service is provided in-house. Census 2016 indicated that the KwaDukuza area consists of 47,524 dwellings.

Quantitative explanatory research has been used for this study. This research method enabled the researcher to quantify respondents' attitudes, views, and behaviors towards the effects of privatizing the solid waste collection service in the KwaDukuza Municipality. Also, this method made it possible for the researcher to conduct a structured study and generate results that can be generalized to the larger population. The study relied on questionnaires, secondary data and relevant legislation, articles, government publications, and affected stakeholders' input, including Ward Committees and Waste Company. The quantitative method was used in order to address the question of to what degree the people of KwaDukuza are impacted (affected or not affected) by the privatization of solid waste collection.

The target population was the areas/wards affected by the privatization of waste collection. KwaDukuza consists of 29 wards, and there are eight affected wards. Furthermore, the waste collection company was also targeted by this study. Hence, the target population consisted of both eight wards and a waste collection company. A simple random sampling was preferred for this study because the possibility of classification errors was removed, and a representative of elements was fair and equal. The primary data was obtained from ward committee members and waste company employees through questionnaires. Therefore, primary data were received from 80 participants (70 ward committee members and ten from waste collection company employees). There were 80 questionnaires distributed to Ward Committees, and fourteen questionnaires distributed to the waste company. The Ward Committee has 80 members, and the waste company has fifteen employees. Hence, the target population was ninety-five participants. According to the Municipal Structures Act of 2003, the ward committees must have ten members per ward. Hence, from the population of 80 ward committees, only 70 were sampled to participate in this study. Sekaran and Bongie (2016) indicated that the sample size for 80 populations is 70 participants. All the questionnaires distributed to the ward committee members were returned back completed. On the other side, the waste collection company has fifteen employees, and only ten participated in the study. According to Sekaran and Bongie (2016), the sample size for fifteen is fourteen. The questionnaires were distributed to fourteen employees, but only ten were returned back. Therefore, not all members from the eight wards and waste company employees were studied.

This being a quantitative study, SPSS version 25 was used to quickly and easily analyze data using descriptive and inferential statistics (Miles, 2013). Thus, using descriptive statistics, data collected provided descriptions of the population mainly through numerical calculations or tables or graphs. Using inferential statistics, the research made inferences and predictions about Ward Committee members and Waste Company at the KwaDukuza Municipality based on a sample of data collected.

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RESULTS AND DISCUSSION

Reliability and Inferential Statistics

The Table 2 below reflects the Cronbach's alpha score for all the items that constituted the questionnaire. The data collected from the responses was analyzed with SPSS version 24.0. The results are presented using descriptive statistics in the form of cross-tabulations. Inferential techniques include correlations and chi-square test values, which are interpreted using the p-values.

Table 2
THE CRONBACH'S ALPHA SCORE

Competency Construct	Items included	Cronbach's alpha	Name of single measure
Willingness	W1-B11	0.875	WIL
Management system	M12 – C15	0.704	MSM
Satisfaction	S16 – D21	0.708	SAT

The reliability scores for all but one section exceed the recommended Cronbach's alpha. This indicates a degree of acceptable, consistent scoring for these sections of the research. Exploration of the data showed that the Likert scale data for Ward Committee (Ward) was not normally distributed, while it was mostly normally distributed for the Waste Company. However, the numbers for Waste Company were small (10 at most). For this reason, the study applied non-parametric tests throughout. For all these Likert scale questions, the study first supplied the response frequencies and then applied a Wilcoxon signed ranks test to test against a neutral score of three. This revealed whether there was significant agreement or disagreement to the statements. Average scores were piloted for easy interpretation.

Positions that the Participants Occupied

The findings showed that the ratio of males to females from the Ward was 3:2 (55.7%: 44.3%), and the ratio of males to females from the Waste Company was 3:2 (60%: 40%). The findings suggest there was an adequate representation between males and females in the study. In the Ward, there were more member respondents (58.6%) followed by others (21.4%) and chairmen (10.0%), as shown in Table 3. In the waste company, there were more employees' respondents (70%), followed by directors (20%) and supervisors (10.0%).

Table 3
POSITION (WARD AND WASTE COMPANY)

Position (Ward)			Position (Waste company)		
	Frequency	Percent		Frequency	Percent
Chairman	7	10	Director	2	20
Vice Chairman	1	1.4	Supervisor	1	10
Secretary	3	4.3	Employee	7	70
Member	41	58.6	Total	10	100

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other	15	21.4			
Total	67	95.7			

The findings on the Ward showed there is an inadequate representation of vice-chairpersons and secretaries in the study. The findings on the Waste company show there is an inadequate representation of supervisors in the study.

Willingness of the Citizen to Pay for the Collection of Solid Waste

Ward Committees

The study found there is significant agreement among respondents that there are too many free riders in the system, Z=-3.556, p<0.0005, as shown in Table 4. The findings, therefore, revealed that there are a lot of citizens benefiting from refuse collection without expending effort or paying for the waste collection service. The findings show a problem in implementing and managing the waste service because citizens utilize the collection of solid waste without contributing their fair share. The finding is supported by the New Public Management theory that states the free-rider problem is a burden on shared resources created by people who are not paying their fair share or are not paying anything at all. Dada and Mbohwa (2016) argued that the free-rider problem could occur in any community. There is a need to make free-riders contribute to solid waste collection. This view is reinforced by the New Public Management theory that posits accountability requires clear assignment of responsibility between stakeholders, including local people.

Table 4
WILLINGNESS TO PAY FOR THE COLLECTION OF SOLID WASTE – WARD (TEST STATISTICS)

	The view the cost of solid waste collection is affordable	Consumers would be able to pay more for better service collection	The billing system is not accurate	There aretoo many free riders in the system	Paying for extra waste collection is too costly
Z	-1.169	-0.190	-0.973	-3.556	-2.881
Asymp. Sig. (2-tailed)	0.242	0.849	0.331	0.000	0.004

There is significant agreement paying for extra waste collection is too costly, Z=-2.881, p<.0004, as shown in table 3. The finding indicated that citizens feel paying for extra waste collection commands a high price they cannot afford. The finding means citizens cannot pay extra for the collection of solid waste. Tozlu et al. (2016) found the same problem and argue there is need for unit pricing where citizens can pay for the collection of solid waste as-they-throw. This is supported by the ninth principle of New Public Management theory, which posits that maximizing the participation of the broadest possible number of people carrying out local service is one sure way of ensuring service delivery. The New Public Management theory also states that the public should be encouraged to participate in service delivery decision-making.

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Waste Company

Five statements (costing of solid waste collection, ability to pay, billing system, too many free riders in the system, paying for extra waste collection) were used to study citizens' willingness to pay for the collection of solid waste in the KwaDukuza municipality from the company's perspective. The study found no significant results, so there was neither significant agreement nor disagreement to any of the statements above, as shown in Table 5 (Willingness to pay for the collection of solid waste). This may be attributed to the sample being too small to get meaningful information.

Table 5
WILLINGNESS TO PAY–WASTE COMPANY (TEST STATISTICS)

	The cost of solid waste collection is affordable	Consumers would be able to pay more for better service collection	The billing system is not accurate	There are too many free riders in the system	Paying for extra waste collection is too costly
Z	-0.798	-1.124	-0.430	-0.183	-0.183
Asymp. Sig. (2-tailed)	0.425	0.261	0.667	0.855	0.855

Effect of privatizing solid waste collection on poor households

Ward committee

The study found significant disagreement because wards believe poor people must pay for waste collection, Z=-5.496, p<0.0000, as shown in Table 6. The findings indicated that citizens see no need to participate in waste collection using the issue of poverty as justification. This may mean citizens do not understand the values and principles for authentic and comprehensive citizen participation in service delivery. The findings go against the New Management theory, which stipulates that public participation in development and service delivery is a non-negotiable condition for good governance and sustainable development. The New Management theory also explains that citizens should have clear areas of responsibility. Without such development within communities, all efforts to provide adequate service delivery would be difficult, if not impossible (Tan et al., 2015).

Table 6
EFFECT OF PRIVATIZATION-WARD (TEST STATISTICS)

	There is equal accessin the collection of solid waste collection.	Poor people have to pay for waste collection.	Road access deprived fair collection inpoor communities	Waste collector employs local people	Poorpeople don't use dumping facilities because they areexpensive
Z	-1.147[a]	-5.496[a]	-4.297[b]	-1.424[b]	-2.675[b]
Asymp. Sig. (2-tailed)	0.252	0.000	0.000	0.154	0.007

a. Based on positive ranks, b. Based on negative ranks, c. Ground Ward, d. Wilcon Signal Ranks Test

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The findings also showed significant agreement that road access deprives fair waste collection in poor communities, Z=-4.297, p<0.0.000, as shown in table 5. The findings showed that road conditions affect waste collection. This may mean that certain roads are inaccessible to trucks that collect waste. The results of this study are similar to those of Simatele and Etambakonga (2017), who found that bad roads with blisters or potholes affect the collection of waste in rural areas. It is difficult to pick up and deliver waste without quality and paved roads in rural areas (Simatele et al., 2017).

Furthermore, the study found significant agreement that people do not use dumping facilities because they are expensive Z=-2.675, p<0.0007, as shown in table 5. The finding may mean citizens find the process of dumping waste expensive as one has to move waste to the dumping site, which may be far away from the community. The findings of this study are similar to the study by Tan et al. (2015), who reported that the residents had difficulties taking waste to the dumping site such that they had to use wheelie bins (of which they do not have) to dump their waste. Also, this study's findings are similar to the one of Hoornweg & Bhada-Tata, (2012), where it was found that households largely use open dumpsites.

Waste company

Findings show significant disagreement in that people do not use dumping facilities because they are expensive Z=-2.707, p<0.0007, as shown in Table 7. The findings showed that the company was of the view that the citizens do not use dumping sites because using dumping facilities is costly. The results of this study resonate well with those of Bralton et al. (2019), who found that citizens were hesitant to interact with service delivery stakeholders to generate a decision and implement them jointly through dialogue, debate and analysis. The New Public Management theory posits there is a need to encourage citizens, no matter how poor or disadvantaged, to engage in a deliberative process before decisions can be made. Scarlat et al. (2015) noted that citizens who label themselves as poor tend not to collaborate or participate and jointly undertake responsibilities at any stage of the decision-making process.

Table 7
EFFECT OF PRIVATIZATION- WASTE COMPANY (TEST STATISTICS)

	There is equal access in the collection of solid waste collection.	Poor people have to pay for waste collection.	Road access deprived fair collection in poor communities	Waste collector employs local people	Poor people do not usedumping facilities because they are expensive
Z	-0.052[a]	-2.707[b]	-1567[a]	-1.008[a]	-0.548[a]
Asymp. Sig. (2-tailed)	-958	0.007	0.117	0.313	0.584

a. Based on positive ranks, b. Based on negative ranks, c. Ground Ward, d. Wilcon Signal Ranks Test

Satisfaction with Waste Collection

The study findings showed that the current provision of waste service once a week was not adequate to the community. There is a need to increase the number of times the waste is collected to the households in a week. The findings indicated a significant agreement to the statement that the current waste collection system provides sustainable access to the community

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(Z=-2.463a, p=0.014), as shown in Table 8. The findings of this study noted that the Wards felt that the waste collection service provided was sustainable. Therefore, Wards believed that the waste collection service provided could constantly exist in the community for a long time. Gumbo and Simelane (2015) found the goals of sustainable waste collection reduces the amount of waste littered around communities and have the potential of making any materials collected to be reused as many times as possible, and the waste created is kept to a minimum.

Table 8
HOUSEHOLD SATISFACTION (TEST STATISTICS[C,D])

	It is satisfied with the number of waste collection perweek (frequency)	Waste collection should at least be done more than two times a week	The current system of collection provides adequate and sustainable access to the community	Most often, it happens that households' waste is not collected	It is satisfied with the level of relationship between waste collector and the community
Z	-0.770[a]	-4.575[a]	-2.463[a]	-1.808[b]	-1.050[b]
Asymp. Sig. (2-tailed)	0.441	0.000	0.014	0.071	0.294

a. Based on negative ranks, b. Based on positive ranks, c. Group = Ward, d. Wilcoxon Signed Ranks Test

Strategies for the Improvement of Waste Collection in Poor Households

The study found significant agreement waste collection should be done by the municipality (Z=-3.610a; p=0.000), as shown in Table 9. The findings showed that citizens want waste collection services to be performed by the government (owning, providing, managing, or delivering the service). This may be attributed to the wards' view, privatization of waste collection does not necessarily translate into improved efficiency, but neither do essential services become affordable. The findings are in sharp contrast to the view of the New Public Management theory that advocates for community participation in the affairs of planning, governance, and overall development programmes at the local or grassroots level (Mafukidze & Hoosen, 2009). Public participation is a crucial aspect of South African planning and is a re-occurring theme in several legislative and theoretical documents (Scarlat et al., 2015). Furthermore, Scarlat et al. (2015) stpulated that the South African Constitution provides the framework for a representative and participatory democratic system.

Table 9
STRATEGIES FOR THE IMPROVEMENT OF WASTE COLLECTION- WARD (TEST STATISTICS)

	The waste collection should be done by the municipality	Waste collection should involve local community	It is satisfied with the present system of waste collection	More education and community participation will ensure a smooth management & collection of solid waste	Waste bins are not big enough to handle the average
Z	-3.610a	-5.552a	-3.048a	-6.716a	-2.975a
Asymp. Sig. (2- tailed)	0.000	0.000	0.002	0.000	0.003

a. Based on positive ranks, b. Based on negative ranks, c. Group = Ward, d. Wilcoxon Signed Ranks Test

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There is significant agreement waste collection should involve the local community (Z-5.552a=0.000), as shown in Table 9. The findings showed that citizens believe that waste collection should be a process where citizens can better understand waste collection issues and share their facts, experiences, knowledge, ideas, preferences, hopes, fears, opinions, and values. The New Public Management theory states that service delivery should be a process that combines the community's energy to produce a better outcome. The local community should be encouraged to participate in waste collection as it is effective when they are involved (Sinthumule & Mkumbuzi, 2019).

There is a significant agreement of satisfaction among respondents with the present waste collection system (Z=-3.048a, p=0.002), as shown in Table 8. The cause for satisfaction was not known. The results of this study are similar to those of Muzenda et al. (2012), which found that the citizens were satisfied with the waste collection system because (i) waste was collected from house-to-house, (ii) the community bins used were placed at a fixed point, (iii) there was self-delivery systems where citizens delivered waste directly to disposal sites. Also, Moya et al. (2017) in their study found that people were satisfied with the waste collection system because of the effective third-party operators hired by the municipality who arrange collection schedules and charges with customers.

The findings of this study also showed a significant agreement that more education would ensure smooth management and collection of solid waste (Z=-6.716a, p=0.000), as shown in Table 9. The findings implied that the Wards believed that the strategies to improve waste collection should include facilitating learning or acquiring knowledge, skills, values, beliefs, and habits concerning the waste collection. The finding resonates well with the New Public Management theory that puts the process of imparting or receiving knowledge and skills as one of the highest priorities on the waste management agenda. The theory further explains that educating citizens is oneway of preparing and qualifying them for work in the community and a way of integrating them into society and teaching them the values of society, such as participating in waste collection. The study results by Mohee and Simelane (2015) also revealed that the education of stakeholders in service delivery could create the flexibility and dynamics for the needed organizational structure for the smooth collection of solid waste.

This study also showed that there is significant agreement that the dirt bins are not big enough to handle the average amounts of dirt generated by local households (Z=-2.975a, p=0.003), as shown in Table 8. The finding shows a larger amount of waste is produced than waste bins provided. This may be because the criteria used to provide large waste bins may not be accurate in addressing the waste issue. The findings of this study were similar to those of Mbuli (2015), which found that citizens were producing more garbage than the bins provided. Therefore, they were forced to dump their waste anyhow because they had no choice of getting a second bin (Mbuli, 2015).

CONCLUSION

The collection of waste is not only beneficial to the households but also for the environment. Based on the results, it is clear that the privatization system has not yielded many outcomes as there are still households who do not pay for the waste collection service as they

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feel that it is too costly and the municipality should perform waste collection. The municipality should re-visit the decision of privatization of waste collection in order to be done in-house.

Due to socio-economic conditions in the rural areas, the local government and private institutions should create measures and programmes that could positively deal with such conditions so that the citizens can fully participate in the waste collection service. Furthermore, the local government must create a proper roads network system in the rural areas to ensure that road access doesn't deprive a fair waste collection in remote areas. An inaccessible road means that it will be difficult for the trucks to collect waste. Thus, households end up using open and illegal dumping facilities. The municipality should also create awareness programmes on waste collection to have relevant information about the management and collection of waste in their areas.

Considering the scope and scale of challenges facing municipalities to provide adequate services, strengthening the capacity of municipalities to deliver an effective waste management service to all areas should be prioritized. The members of the community, especially in the rural areas, want to enjoy the benefits of the waste collection service regardless of their socio-economic conditions. Whether the solid waste management service is contracted out or implemented in-house, adequate and sustainable financing is fundamental to ensure access to quality waste services for all. Due to the reason that not all community members can financially afford to pay for waste collection or take waste to the dumping sites, the local government should find alternative ways to raise revenue to cover the cost of running the service. If the municipalities are unable to raise/collect sufficient revenue, then the national government should contribute more of the national fiscus to municipalities to ensure effective implementation of waste management service.

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